RED SEAL

THE INTERPROVINCIAL STANDARDS RED SEAL PROGRAM

National Occupational Analysis

2013 | Mobile Crane Operator

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Canada

National Occupational Analyses

Mobile Crane Operator

2013

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FOREWORD

The Canadian Council of Directors of Apprenticeship (CCDA) recognizes this National Occupational Analysis (NOA) as the national standard for the occupation of Mobile Crane Operator.

Background

The first National Conference on Apprenticeship in Trades and Industries, held in Ottawa in 1952, recommended that the federal government be requested to cooperate with provincial and territorial apprenticeship committees and officials in preparing analyses of a number of skilled occupations. To this end, Human Resources and Skills Development Canada (HRSDC) sponsors a program, under the guidance of the CCDA, to develop a series of NOAs.

The NOAs have the following objectives:

- to describe and group the tasks performed by skilled workers;
- to identify which tasks are performed in every province and territory;
- to develop instruments for use in the preparation of Interprovincial Red Seal Examinations and curricula for training leading to the certification of skilled workers;
- to facilitate the mobility of apprentices and skilled workers in Canada; and,
- to supply employers, employees, associations, industries, training institutions and governments with analyses of occupations.

ACKNOWLEDGEMENTS

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This analysis was prepared by the Labour Market Integration Directorate of HRSDC. The coordinating, facilitating and processing of this analysis were undertaken by employees of the NOA development team of the Trades and Apprenticeship Division. The host jurisdiction of Saskatchewan also participated in the development of this NOA.

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STRUCTURE OF ANALYSIS

To facilitate understanding of the occupation, the work performed by tradespersons is divided into the following categories:

Blocks	the largest division within the analysis that is comprised of a distinct set of trade activities
Tasks	distinct actions that describe the activities within a block
Sub-Tasks	distinct actions that describe the activities within a task
Key Competencies	activities that a person should be able to do in order to be called 'competent' in the trade

The analysis also provides the following information:

Trends	changes identified that impact or will impact the trade including work practices, technological advances, and new materials and equipment
Related Components	list of products, items, materials and other elements relevant to the block
Tools and Equipment	categories of tools and equipment used to perform all tasks in the block; these tools and equipment are listed in Appendix A
Context	information to clarify the intent and meaning of tasks
Required Knowledge	elements of knowledge that an individual must acquire to adequately perform a task

The appendices located at the end of the analysis are described as follows:

Appendix A — Tools and Equipment	non-exhaustive list of tools and equipment used in this trade
Appendix B — Glossary	definitions or explanations of selected technical terms used in the analysis
Appendix C — Acronyms	list of acronyms used in the analysis with their full name
Appendix D — Block and Task Weighting	the block and task percentages submitted by each jurisdiction, and the national averages of these percentages; these national averages determine the number of questions for each block and task in the Interprovincial exam
Appendix E — Pie Chart	graph which depicts the national percentages of exam questions assigned to blocks
Appendix F — Task Profile Chart	chart which outlines graphically the blocks, tasks and sub-tasks of this analysis

Development of Analysis

A draft analysis is developed by a committee of industry experts in the field led by a team of facilitators from HRSDC. This draft analysis breaks down all the tasks performed in the occupation and describes the required knowledge and key competencies required for a tradesperson to demonstrate competence in the trade.

Draft Review

The NOA development team then forwards a copy of the analysis and its translation to provincial and territorial authorities for a review of its content and structure. Their recommendations are assessed and incorporated into the analysis.

Validation and Weighting

The analysis is sent to all provinces and territories for validation and weighting. Participating jurisdictions consult with industry to validate and weight the document, examining the blocks, tasks and sub-tasks of the analysis as follows:

BLOCKS	Each jurisdiction assigns a percentage of questions to each block for an examination that would cover the entire trade.
TASKS	Each jurisdiction assigns a percentage of exam questions to each task within a block.
SUB-TASKS	Each jurisdiction indicates, with a YES or a NO, whether or not each sub-task is performed by skilled workers within the occupation in its jurisdiction.

The results of this exercise are submitted to the NOA development team who then analyzes the data and incorporates it into the document. The NOA provides the individual jurisdictional validation results as well as the national averages of all responses. The national averages for block and task weighting guide the Interprovincial Red Seal Examination plan for the trade.

This method for the validation of the NOA also identifies common core sub-tasks across Canada for the occupation. If at least 70% of the responding jurisdictions perform a sub-task, it shall be considered common core. Interprovincial Red Seal Examinations are based on the common core sub-tasks identified through this validation process.

Definitions for Validation and Weighting

YES	sub-task performed by qualified workers in the occupation in a specific jurisdiction
NO	sub-task not performed by qualified workers in the occupation in a specific jurisdiction
NV	analysis Not Validated by a province/territory
ND	trade Not Designated in a province/territory
NOT COMMON CORE (NCC)	sub-task, task or block performed by less than 70% of responding jurisdictions; these will not be tested by the Interprovincial Red Seal Examination for the trade
NATIONAL AVERAGE %	average percentage of questions assigned to each block and task in Interprovincial Red Seal Examination for the trade

Provincial/Territorial Abbreviations

NL	Newfoundland and Labrador
NS	Nova Scotia
PE	Prince Edward Island
NB	New Brunswick
QC	Quebec
ON	Ontario
MB	Manitoba
SK	Saskatchewan
AB	Alberta
BC	British Columbia
NT	Northwest Territories
YT	Yukon Territory
NU	Nunavut

ANALYSIS

Safe working procedures and conditions, accident prevention, and the preservation of health are of primary importance to industry in Canada. These responsibilities are shared and require the joint efforts of government, employers and employees. It is imperative that all parties are aware of circumstances and conditions that may lead to injury or harm. Safe learning experiences and work environments can be created by controlling the variables and behaviours that may contribute to accidents or injury.

It is generally recognized that safety-conscious attitudes and work practices contribute to a healthy, safe and accident-free work environment.

It is imperative to apply and be familiar with the Occupational Health and Safety (OH&S) Acts and Workplace Hazardous Materials Information System (WHMIS) regulations. As well, it is essential to determine workplace hazards and take measures to protect oneself, co-workers, the public and the environment.

Safety education is an integral part of training in all jurisdictions. As safety is an imperative part of all trades, it is assumed and therefore it is not included as a qualifier of any activities. However, the technical safety tasks and sub-tasks specific to the trade are included in this analysis.

SCOPE OF THE MOBILE CRANE OPERATOR TRADE

"Mobile Crane Operator" is this trade's official Red Seal occupational title approved by the CCDA. This analysis covers tasks performed by mobile crane operators whose occupational title has been identified by some provinces and territories of Canada under the following names:

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
Crane and Hoist Operator								✓					
Crane and Hoisting Equipment Operator - Branch 1: Mobile Crane Operator							✓						
Crane and Hoisting Equipment Operator - Mobile Crane									✓		✓		
Crane Operator					✓								
Mobile Crane Operator	✓	✓	✓	✓									
Mobile Crane Operator (Lattice Boom Friction Crane)										✓			
Mobile Crane Operator - Branch 1 (over 8 tons)						✓							

Mobile crane operators operate mobile cranes to lift, move, position and place materials and equipment. They perform pre-operational inspections. They calculate crane capacities, determine load weight, and set up, position and stabilize the crane before the lift. Mobile crane operators have the additional responsibilities of disassembling, traveling and transporting mobile cranes. They may also participate in rigging procedures. They also perform some routine maintenance and housekeeping of the crane equipment such as lubricating and cleaning.

Mobile cranes are used in many industry sectors. They are very commonly used in the construction of buildings and the assembly of large equipment. They are used in locations such as construction sites, warehouses, factories, mines, oil rigs, refineries, railway yards, ships, windmill farms and ports. Mobile crane operators may be employed by rental companies, construction firms, manufacturers, public utilities, transport sector companies, ship builders, cargo-handlers, airports, railways and mines.

Mobile cranes come in different types such as crawlers, truck-mounted, rough-terrain and all-terrain. The boom of the crane may be lattice or telescopic. Some mobile cranes are fitted with equipment, including piledriver, clamshell, dragline, wrecking ball, magnet and personnel basket, which can perform specialized functions. They may be outfitted with heavy lift attachments, tower attachments and luffing jibs.

Some mobile crane operators specialize in different crane functions. In some cases, an operator may work for years on a single large site, operating a single type and size of mobile crane. Mobile crane operators working for rental companies may rarely work on the same site more than once and may routinely perform a variety of tasks with different types and sizes of mobile cranes.

The majority of the work in this trade is outdoors. Key attributes for people entering the trade are strong communication skills, mechanical aptitude, mathematical ability, excellent visual and depth perception and a high degree of hand-foot-eye coordination. The operation of some mobile cranes is physically demanding as is the handling of accessories.

Mobile crane operators interact with other tradespeople, contractors and customers.

The skills of mobile crane operators are transferable to operating other heavy equipment. With experience, mobile crane operators may move into careers such as business owners, supervisors, trainers and job coordinators.

OCCUPATIONAL OBSERVATIONS

Safety is the number one concern of mobile crane operators, owners and contractors. Mobile crane operators are required to take site-specific safety training to be familiar with the company, contractor and jobsite safety requirements. The regulatory environment in which Canada's crane industry operates continues to grow more complex and more rigorous, covering issues such as due diligence and liability.

As cranes are becoming more sophisticated and larger, the need for training is increasing. There is new knowledge in computer technology, metallurgy and other disciplines associated with the engineering of crane equipment. These technologies are ever evolving and new materials continue to make equipment stronger, lighter and easier to assemble.

Operator aids such as load moment indicators (LMI) continue to evolve making mobile crane operators more informed of the crane operations. The introduction of cameras is allowing for greater visibility around the crane. Improvements in cab design are allowing for a wider range of crane functions to be performed from the cab. The use of computer technology is contributing to better accuracy in crane operation.

Essential skills are needed for work, learning and life. They provide the foundation for learning all other skills and enable people to evolve with their jobs and adapt to workplace change.

Through extensive research, the Government of Canada and other national and international agencies have identified and validated nine essential skills. These skills are used in nearly every occupation and throughout daily life in different ways.

A series of CCDA-endorsed tools have been developed to support apprentices in their training and to be better prepared for a career in the trades. The tools can be used independently or with the assistance of a tradesperson, trainer, employer, teacher or mentor to:

- understand how essential skills are used in the trades;
- learn about individual essential skills strengths and areas for improvement; and
- improve essential skills and increase success in an apprenticeship program.

The tools are available online or for order at: www.hrsdc.gc.ca/essentialskills.

The application of these skills may be described throughout this document within the competency statements which support each subtask of the trade. The following are summaries of the requirements in each of the essential skills, as described by subject matter experts who participated in the NOA for mobile crane operator (hydraulic). A link to the complete essential skills profile can be found at www.red-seal.ca.

Reading
In their daily work, mobile crane operators read and comprehend several types of texts. These include safety and work procedures as well as more complex hoisting regulations and manufacturers' operating manuals.

Document Use
Mobile crane operators use workplace documents such as logbooks, load charts, hazard assessments and workplace policies and procedures to carry out their job. They must be familiar with regulations relating to hoisting, rigging and safe work environments. They must have the ability to read and interpret manufacturers' specifications and load charts for the model of crane they are using. Depending on site-specific requirements, they may obtain information from engineered and construction drawings and plans.

Writing
Mobile crane operators use writing skills to record comments or notes in logbooks or work records. They write messages to colleagues or management to give work details or reply to requests for technical information. They may also write longer descriptions and explanations for various reporting and data collection forms.

Oral Communication
Mobile crane operators use oral communication skills to coordinate work with site crews. Clear communication of technical and complex information is very important to avoid injuries and promote efficiency. Mobile crane operators also use communication skills when instructing apprentices, co-workers and on-site work crews. Good listening and visual skills are also required to communicate with riggers, signallers and other operators during lifts. Operators use verbal communication and hand signals to communicate the speed of lift movements and precise positioning of loads.

Numeracy
Mobile crane operators use a range of math skills in their daily work. These include mathematical and physics concepts such as conversions, geometry, algebraic calculations, measurement and calculation of load and lift requirements. They use code books, load charts and manufacturers' specifications to further determine procedures, limits and the necessary equipment for rigging and hoisting.

Thinking Skills
Mobile crane operators must use decision-making skills to perform work planning and prioritizing. The decisions they make about the sequence of work have implications for everyone on site. Mobile crane operators require strong analytical skills to effectively use their equipment.

Mobile crane operators use problem solving skills to choose setup locations and crane configurations for specific jobs. During lifts mobile crane operators make operational decisions to start, stop and vary the speed and direction of lifts to ensure safe movement and placement of a load. They evaluate the safety of lifts before and during lifts, and stop work if necessary.

Working with Others
To be effective, mobile crane operators must establish close and ongoing job-task coordination with other workers on the job site. They work closely with clients to plan lifts and ensure that their activities are coordinated with those of on-site crews. They are in close communication with riggers, signallers and supervisors to coordinate lifts and load placements. Mobile crane operators work in close coordination with other operators when performing multiple crane lifts and when in close proximity with other cranes and heavy equipment.

Computer Use
Mobile crane operators are increasingly required to interpret electronic data transmitted from LMI, anemometers and electronic scales to a display located in the cab of the crane. Controls for the mobile crane may also involve computerized applications.

Continuous Learning
As construction methods and crane technology are advancing, mobile crane operators must keep abreast of these developments. There are requirements for site or crane specific training and regulatory changes that may require additional certification and ongoing learning to ensure compliance and safe working conditions.

Trends There is an increased emphasis on safety and related documentation. There is also an increase in the use of engineered drawings.

Related Components All components apply.

Tools and Equipment See Appendix A.

Task 1 Performs safety-related functions.

Context Mobile crane operators must recognize any changing conditions in their work environment that could affect safety.

Required Knowledge

K 1	worn and defective hand and power tools
K 2	defective components for oxy-acetylene and propane torches
K 3	deficiencies in cables and sheaves such as wear, deformation and fraying
K 4	types of personal protective equipment (PPE) such as fire-retardant coveralls, safety boots, hard hats, eye protection, hearing protection, fall arrest harnesses and survival suits
K 5	types of safety equipment such as first aid kits, fire extinguishers and spill kits
K 6	occupational hazards such as chemicals, oil spills, high tension wires and weather
K 7	WHMIS
K 8	OH&S
K 9	standards and guidelines such as Canadian Standards Association (CSA) Z150
K 10	disposal of hazardous materials
K 11	limits of approach to power lines

Sub-task

A-1.01 **Maintains a safe work environment.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

A-1.01.01	clean any oil or grease off deck of crane to avoid slip hazards
A-1.01.02	clean windows to ensure good visibility
A-1.01.03	remove worn, damaged and defective hand tools from service
A-1.01.04	tighten loose bolts such as on ladders, hand railings and fenders
A-1.01.05	maintain 3-point contact for stability when climbing ladders
A-1.01.06	perform good housekeeping such as remove debris from cab and around the crane
A-1.01.07	handle chemicals according to manufacturers' instructions
A-1.01.08	set out barricade tape or pylons to control access to work area
A-1.01.09	follow toolbox and field level risk assessment (FLRA) meeting recommendations

Sub-task

A-1.02 **Uses personal protective equipment (PPE) and safety equipment.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

A-1.02.01	select and wear PPE such as hard hats, eye protection and fall arrest equipment according to task and site-specific requirements
A-1.02.02	select and operate safety equipment such as fire extinguishers
A-1.02.03	check PPE for proper fit
A-1.02.04	check PPE and safety equipment for wear and defects such as abrasions, tears and cracks
A-1.02.05	replace deficient PPE and safety equipment
A-1.02.06	clean, maintain and store PPE and safety equipment according to manufacturers' specification and site requirements

Task 2 Organizes work.

Context Communication in this trade is vital so that all personnel involved in the lift are aware of what is happening. Documentation such as logbooks, FLRA and crane certification are essential for organizing daily operations of a crane.

Required Knowledge

K 1	standard hand signals
K 2	radio communication
K 3	types of documentation such as manufacturers' specifications, operator manuals, permits, load charts, logbooks, job scope analysis (JSA), site orientation, lift plan and FLRA
K 4	jurisdictional legislation and regulations
K 5	site-specific requirements
K 6	CSA Z150 standard
K 7	crane operators' legal responsibilities

Sub-task

A-2.01 Communicates with others.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

A-2.01.01	use hand signals according to industry standards
A-2.01.02	use radio communication when needed such as in blind lifts, personnel basket lifts, multiple crane lifts and when vision is obscured
A-2.01.03	coordinate lift responsibilities with crew members and other tradespeople in the work area and at pre-lift meetings
A-2.01.04	direct apprentices in order to complete job functions such as erecting, dismantling, moving and operating cranes
A-2.01.05	participate in meetings such as toolbox, safety and orientation meetings
A-2.01.06	report problems and unsafe conditions to individuals such as safety officers and supervisors according to company policies and procedures
A-2.01.07	confirm roles and responsibilities of crew members that will be participating in the transport and organizing escort vehicles

Sub-task

A-2.02 Uses documentation.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

A-2.02.01	document lift responsibilities of all personnel involved in lift on a FLRA or hazard assessment according to site and company policies
A-2.02.02	record information such as hours of service, maintenance performed and deficiencies in daily logbook
A-2.02.03	check off in logbook the working condition of components
A-2.02.04	fill out maintenance request forms as required by scheduled or unscheduled maintenance needs or concerns
A-2.02.05	fill out driver's daily logbook according to regulations
A-2.02.06	interpret engineered lift drawings
A-2.02.07	interpret safety documentation such as WHMIS and Power Line Hazards (PLH)
A-2.02.08	check crane, rigging and attachments' certification for expiry dates and report if expired

Trends

Employers, contractors and mobile crane operators are placing more emphasis on the accurate interpretation of load charts for safe operation. This emphasis is due to an increased awareness around safety and the complexity of charts and configurations.

Related Components

All components apply.

Tools and Equipment

See Appendix A.

Task 3 Determines load weights.

Context

The ability to accurately calculate the load weight is vital to the safe operation of mobile cranes.

Required Knowledge

K 1	sources of load weight information such as bills of lading, stamped weights, engineered drawings and previous lift history
K 2	formulas for conversion between imperial and metric systems
K 3	basic geometry
K 4	factors contributing to load weight and centre of gravity such as ice, snow, crating, shifting liquids, wind and lifting in water
K 5	material weight by volume
K 6	formulas for calculating volume

Sub-task

B-3.01 **Identifies the weight.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

B-3.01.01	refer to unit chart to determine weight of material to be lifted
B-3.01.02	verify units of measurement (metric or imperial) when missing or incorrect on documentation such as bills of lading and blueprints
B-3.01.03	confirm that no modifications have been made that affect the weight of the object
B-3.01.04	compare object to blueprints or engineered drawings to confirm that no weight has been added

Sub-task

B-3.02 **Calculates weight.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

B-3.02.01	determine and apply formulas needed depending on object shape
B-3.02.02	perform mathematical calculations such as volume times unit weight for weights of objects

Task 4 Calculates crane capacity.

Context Calculating crane capacity involves interpreting load charts, range diagrams and manufacturers' specifications. Important considerations are radius and crane configuration.

Required Knowledge

K 1	manufacturers' specifications such as load charts and range diagrams
K 2	jurisdictional safety regulations and site-specific requirements
K 3	standards such as CSA Z150

K 4	methods of measuring radius such as measuring tape and dry run
K 5	line pull and working load limit (WLL)
K 6	boom deflection
K 7	radius, boom length, angle, and gross and net capacity
K 8	attachments and configurations, and capacity deductions

Sub-task

B-4.01 **Determines radius and crane configuration.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

B-4.01.01	measure horizontal distance from centre of rotation to centre of gravity of the suspended load
B-4.01.02	use range diagram to determine boom length and offsets needed to ensure radius and tip height can be achieved
B-4.01.03	refer to manufacturers' specifications for configurations such as counterweight, crawler and outrigger configuration
B-4.01.04	determine main boom angle when boom is partially extended and the jib is erected by using range diagram

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Sub-task

B-4.02 **Interprets load charts.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

B-4.02.01	refer to the load charts for reductions of rated capacity
B-4.02.02	calculate gross load and net capacity
B-4.02.03	determine crane capacity using boom length, angle and radius
B-4.02.04	locate warnings within load charts, range diagrams and manufacturers' notes
B-4.02.05	de-rate crane capacity using various site restrictions

Task 5 — Performs rigging calculations.

Context Accurate rigging calculations are important for the proper selection and use of rigging and hardware to ensure safe hoisting operations.

Required Knowledge

K 1	sling and hardware capacity
K 2	sling angle chart
K 3	sling tension formulas
K 4	effect of sling angle on sling capacity
K 5	lift data such as available rigging, pick points, load size, weight and centre of gravity
K 6	sizes and types of slings
K 7	sling configurations (hitches) such as choker, basket, vertical and bridle
K 8	design factors of safety according to jurisdictional regulations
K 9	sizes and types of hardware such as shackles, lifting eyes and beams

Sub-task

B-5.01 Performs sling angle calculations.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

B-5.01.01	determine rigging capacity by referring to charts or doing manual calculations
B-5.01.02	calculate the angle of each sling leg to determine the effect of the angle on the tension of the sling
B-5.01.03	calculate the different sling leg tension based on offset centre of gravity and unequal sling loading

Sub-task

B-5.02 **Performs working load limit (WLL) calculations.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

B-5.02.01	determine factors that affect the strength of the sling such as choke, basket, vertical or bridle configuration
B-5.02.02	interpret engineers' and manufacturers' specifications
B-5.02.03	use formulas to calculate rigging capacity and sling tension

Trends

More standardized maintenance is being monitored by computers. It is more common to have regular inspections/certifications of cranes. Some new cranes have features such as self-greasers eliminating manual greasing of many moving parts. Continued emphasis on manually maintaining older cranes is still required as many are still in operation.

Related Components

All components apply.

Tools and Equipment

See Appendix A.

Task 6 Performs pre-operational checks and regular inspections.

Context

Safety is the primary reason for thorough inspection and maintenance. Minor maintenance may be done by mobile crane operators, but repairs should be performed by qualified technicians.

Required Knowledge

K 1	engine system components and accessories
K 2	air system components such as air lines, compressors, belts, dryer systems and air tanks
K 3	electrical system components such as charging systems, lights, signals, alternators, starters, belts, batteries and gauges
K 4	hydraulic system components such as hoses, pumps, motors, filters and tanks
K 5	types of hydraulic oils and their properties such as viscosity, anti-foaming and anti-corrosion
K 6	chassis/car body and running gear components such as steering, braking mechanisms, suspension, drive train, tracks and wheels
K 7	outrigger components such as beams, jacks and floats
K 8	types of counterweights such as fixed, stackable, removable and bumper
K 9	booms such as lattice and telescopic
K 10	boom attachments such as luffing jibs, swing-away jibs, extensions and auxiliary sheaves

K 11	boom components such as sections, pendant lines and bars, wear pads, telescopic cables and chain systems, pinned boom components and manual section
K 12	jurisdictional requirements for non-destructive testing and complete tear-down inspections
K 13	hoisting system components such as clutches, brakes, pumps, hook blocks, overhaul balls, wedge sockets, clamps and sheaves
K 14	types of wire rope construction such as rotation resistant, right regular lay and left regular lay
K 15	manufacturers' specifications
K 16	hydraulic pump systems such as direct drive and drive shaft
K 17	types of hydraulic pumps such as variable and fixed displacement
K 18	jurisdictional requirements for systems inspection intervals
K 19	jurisdictional regulations for pre- and post-trip inspections and air brake pre-trip inspection, and required documentation
K 20	rejection criteria for worn or consumable parts such as air filters, brakes and tires

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Sub-task

C-6.01 **Inspects engine systems.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

C-6.01.01	check engine system for damage such as leaks, cracks and worn hoses
C-6.01.02	measure belt tension and check belt condition for signs of fatigue
C-6.01.03	verify that components such as alternator, pumps and starter are secure
C-6.01.04	check engine fluids such as fuel, oil and coolant
C-6.01.05	check air filter to determine level of restriction in air intake system and to ensure system is sealed
C-6.01.06	check operation of air intake emergency shut off valve

Sub-task

C-6.02 **Inspects air systems.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

C-6.02.01	identify air system failures such as air leaks, blockages and frozen lines
C-6.02.02	check brake system for air leaks by application
C-6.02.03	test compressor's cut-in/cut-out and recovery times
C-6.02.04	check air tanks for corrosion and listen for leaks
C-6.02.05	check hoses and lines for signs of fatigue such as cracks, wear and corrosion
C-6.02.06	purge air tank

Sub-task

C-6.03 **Inspects electrical systems.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

C-6.03.01	verify function of electrical system components such as charging system, lights, signals, alternators, starters, belts, batteries and gauges
C-6.03.02	recognize signs of electrical system failures and deficiencies such as poor ground, bad connections and chafing

Sub-task

C-6.04 **Inspects hydraulic systems.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

C-6.04.01	check hydraulic oil level using sight gauge according to manufacturers' recommendations
C-6.04.02	check hoses and lines for routing, leaks and signs of fatigue such as cracks, wear and corrosion

C-6.04.03	check hydraulic oil filter gauge to determine level of restriction in return system
C-6.04.04	check cylinders for leaks and wear

Sub-task

C-6.05 **Inspects chassis/car body and running gear components.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

C-6.05.01	check tire pressure and condition
C-6.05.02	identify track damage such as cracked pads, broken pins, and worn chains, sprockets and idlers
C-6.05.03	identify chassis and drive train damage such as loose universal joints, leaking seals and broken fittings
C-6.05.04	verify steering system operation and integrity
C-6.05.05	check adjustment and wear on brake systems
C-6.05.06	check for deficiencies such as loose and broken brake chambers, leaking cylinders and broken springs
C-6.05.07	check all operator cab components such as wipers, heaters, defrosters and mirrors are functioning
C-6.05.08	verify that non-destructive testing of components and attachments has been conducted according to jurisdictional requirements

---

Sub-task

C-6.06 **Inspects outriggers and counterweights.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

C-6.06.01	verify configuration, position and security of counterweights, outrigger beams, boxes and floats
C-6.06.02	check for damage to outrigger boxes, beams, wear pads, jacks and outrigger floats
C-6.06.03	check for damage to counterweights and lifting lugs

C-6.06.04	verify that non-destructive testing of components and attachments has been conducted according to jurisdictional requirements
C-6.06.05	verify required crane mats and blocking in relation to the crane float size and ground conditions

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Sub-task

C-6.07 **Inspects boom components and attachments.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

C-6.07.01	check components and attachments for cracks, corrosion, bent lacing, bent main chords, loose and unsecured objects, damaged pendant lines and bars, worn wear pads, and missing pins and keepers
C-6.07.02	verify that non-destructive testing of components and attachments has been conducted according to jurisdictional requirements
C-6.07.03	verify that attachments are safely stowed and secured

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Sub-task

C-6.08 **Inspects hoisting systems.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

C-6.08.01	check condition of rope for lubrication, wear and other damage such as bird caging, broken wires, damaged core and crushing
C-6.08.02	verify that wire rope is spooling correctly on drum
C-6.08.03	check routing of wire rope around sheaves according to manufacturers' specifications
C-6.08.04	visually check all reeving and end terminations including the position of the wire rope clip
C-6.08.05	inspect hook block and ball for cracks or deformities, and confirm that hook throat openings are within specifications
C-6.08.06	measure sheave tolerances

C-6.08.07	check lubrication of sheaves and swivels
C-6.08.08	verify operation of hook latch and positive latch
C-6.08.09	verify that non-destructive testing of hoisting components such as block/ball has been conducted according to jurisdictional requirements

Task 7 — Performs operational and continual checks.

Context Regular inspections and maintenance keep the crane in good working order. Ongoing monitoring of displays and warning systems is important in order to stay aware of changing conditions that may affect safe and efficient operation.

Required Knowledge

K 1	weather conditions such as wind, lightning and temperature
K 2	ground conditions such as soil compaction and grade
K 3	water conditions such as tides, waves and currents
K 4	location of underground utilities
K 5	manufacturers' specifications
K 6	hoist lines, boom-hoist lines and pendant lines
K 7	anti-two block system
K 8	operating controls such as levers, joysticks, foot brakes, swing brakes, positive swing locks and boom pawls
K 9	LMI and load-monitoring devices

Sub-task

C-7.01 Checks operating controls.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

C-7.01.01	verify that operating controls activate required crane functions such as boom, winch, swing and telescope
C-7.01.02	verify that swing brakes such as manual, electric and positive lock are functioning

Sub-task

C-7.02 **Inspects monitoring and warning systems.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

C-7.02.01	check installation and connection of wiring of anti-two block system
C-7.02.02	test anti-two block system to confirm operation of audible alarm and function disabling features
C-7.02.03	check warning systems such as back-up alarms, by-pass switches, horns and swing indicators (alarms or lights)
C-7.02.04	verify that limit switches are in working order
C-7.02.05	check LMI system and mechanical indicators for boom angle, boom length and radius

Sub-task

C-7.03 **Monitors running lines, hoist lines and standing ropes.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

C-7.03.01	verify that wire rope is spooling correctly on drum taking into consideration adverse weather conditions such as wind, ice build-up and extreme cold temperatures
C-7.03.02	monitor variations in drum rotation speed using mirrors or instruments such as mechanical indicators and display monitors in order to accommodate winch speed requirements
C-7.03.03	monitor operational performance of running lines, boom-hoist drum and pendants
C-7.03.04	identify hoist line defects such as kinking, fraying and twisting

Sub-task

C-7.04 **Monitors gauges and warning systems.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

C-7.04.01	read gauges and understand in-cab warning systems
C-7.04.02	verify accuracy of information displayed by LMI

Task 8 — Performs minor crane maintenance.

Context Minor maintenance may be done by mobile crane operators, but repairs should be performed by qualified technicians.

Required Knowledge

K 1	location and types of filters, drain plugs, filler caps and shut-off valves
K 2	types of engines (gas or diesel)
K 3	types of oils and viscosities
K 4	spill kits
K 5	disposal requirements
K 6	locations of grease fittings from manufacturers' specifications
K 7	types of grease
K 8	manufacturers' specifications
K 9	types of lubricants such as wire rope dressing
K 10	normal crane operation
K 11	company policies and procedures
K 12	control of hazardous energy requirements (lock-out, tag-out procedures)
K 13	types of electrical systems such as series and parallel battery configurations

Sub-task

C-8.01 **Changes oil and filters.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

C-8.01.01 drain and replace oil according to manufacturers' requirements at intervals stated by company policies and procedures

C-8.01.02 remove and replace required filters according to manufacturers' requirements at intervals stated by company policies and procedures

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Sub-task

C-8.02 **Greases crane.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

C-8.02.01 locate grease points according to manufacturers' specifications

C-8.02.02 apply grease to identified points using tools such as grease guns, brushes, rollers and aerosol spray cans according to manufacturers' specifications

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Sub-task

C-8.03 **Lubricates wire ropes.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

C-8.03.01 recognize the need for lubrication based on changing operational conditions

C-8.03.02 apply lubricant using methods such as spraying and brushing

Sub-task

C-8.04 Makes minor adjustments and replacements.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

C-8.04.01	drain air tanks
C-8.04.02	change hoses
C-8.04.03	replace electrical components such as bulbs and fuses
C-8.04.04	adjust and replace wear pads
C-8.04.05	adjust carrier brakes
C-8.04.06	adjust track tension
C-8.04.07	boost dead battery

Trends

There is an increasing range of methods to indicate deficiencies in slings such as fibre optic and overload indicators. Bar coding and computerized tracking of rigging equipment is becoming mainstream.

Related Components (including, but not limited to)

Blocks, bridles, chains, chokers, come-alongs (wire rope or chain), equalizer beams, eye bolts, hooks, lines, rope guides, saddle cable clips, shackles, sheaves, slings, spreader bars, swivels, tag lines, turnbuckles, wedge sockets.

Tools and Equipment

See Appendix A.

Task 9 — Inspects, maintains and stores slings and hardware.

Context

Mobile crane operators are involved in rigging to ensure that it is done safely and properly. While mobile crane operators may not be doing the rigging, they must possess knowledge of rigging procedures. Mobile crane operators have the final say and responsibility for any lift done by the crane.

Required Knowledge

K 1	types of lubricants such as wire rope dressing and aerosol sprays
K 2	types of slings such as steel and synthetic
K 3	types of hardware such as shackles, spreader beams and lifting beams
K 4	potential deformities in steel slings and hardware such as kinks, broken wires and misshapen components
K 5	potential damage to synthetic slings and hardware such as frays, cuts and stretching
K 6	disposal criteria and procedures according to company policy
K 7	inspection, maintenance and removal from service according to jurisdictional regulations, manufacturers' specifications and company policy

Sub-task

D-9.01 **Lubricates slings and hardware.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

D-9.01.01	inspect slings and hardware to determine if they require lubrication
D-9.01.02	select and apply lubricant considering factors such as working conditions, environmental requirements and manufacturers' specifications

Sub-task

D-9.02 **Identifies deficiencies in slings and hardware.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

D-9.02.01	visually inspect slings according to jurisdictional regulations and manufacturers' specifications for damage such as broken wires, cuts, nicks, stretching, worn links, crushing, missing identification tags and kinking
D-9.02.02	visually inspect hardware such as shackles and hooks according to jurisdictional regulations and manufacturers' specifications for damage such as stretching, missing or damaged hook latches, and pins not seating properly
D-9.02.03	report damaged item according to company policy

Sub-task

D-9.03 **Disposes of damaged slings and hardware.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

D-9.03.01	remove damaged slings and hardware from service according to jurisdictional regulations, manufacturers' and site specifications
D-9.03.02	tag/mark damaged slings and hardware before disposal according to company policy

D-9.03.03	cut damaged slings and hardware to prevent further use according to company policy
D-9.03.04	report disposal and removal of damaged item according to company policy

---

Sub-task

D-9.04 **Stores slings and hardware.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

D-9.04.01	verify storage area will prevent damage to rigging equipment from weather and other site factors such as concrete dust, ultraviolet (UV) damage, chemicals and extreme heat
D-9.04.02	organize rigging in designated storage area considering factors such as equipment pairing and placement

---

Task 10 Follows rigging procedures.

Context Mobile crane operators have the final say and responsibility for any lift done by the crane.

Required Knowledge

K 1	WLL and Safe Working Load (SWL)
K 2	how sling angles and configuration affect load on rigging and compression on load
K 3	types of rigging and their applications
K 4	types of hitches such as vertical, choker, basket and bridle
K 5	characteristics of load such as weight, centre of gravity, lifting points and dimensions
K 6	working conditions which may affect rigging such as acids and caustic substances
K 7	environmental conditions such as temperature, weather and UV
K 8	site-specific regulations regarding rigging

K 9	applicable standards and guidelines such as jurisdictional regulations and manufacturers' specifications
K 10	engineered drawings pertaining to rigging
K 11	effect of factors such as temperature and chemicals on sling type

---

Sub-task

D-10.01 Selects required rigging.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

D-10.01.01	determine rigging requirements to handle load taking into consideration factors such as load weight, load dimensions, sharp edges, rigging equipment composition, height limitations and destination
D-10.01.02	check identification tag on rigging equipment to confirm equipment is adequate for the application

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Sub-task

D-10.02 Rigs load.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

D-10.02.01	locate centre of gravity of load
D-10.02.02	apply rigging to load using techniques such as basket, choker, vertical hitch and multi-leg bridle, and using components such as lifting bars and beams according to load requirements
D-10.02.03	verify rigging position by applying tension to rigging and make any necessary adjustments
D-10.02.04	confirm the absence of loose debris and hazardous materials such as nails, dunnage, and rocks on and around the load
D-10.02.05	select tag lines and confirm they are positioned to facilitate control of the load

Sub-task

D-10.03 Monitors rigging.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

D-10.03.01	identify rigging hazards such as obstacles during lifting and landing the load
D-10.03.02	watch tag lines and advise rigger to prevent problems such as tangled and knotted tag lines, and injury
D-10.03.03	watch for rigging problems such as potential slippage and catching on other objects
D-10.03.04	lower load to adjust, change and orientate rigging to address deficiencies

BLOCK E — LIFT PLANNING, SITE PREPARATION AND CRANE SETUP

Trends	Cranes are evolving with computerized aids to assist with levelling and monitoring outrigger loading. Companies are more involved in pre-lift planning.
Related Components	All components apply.
Tools and Equipment	Calculator, measuring equipment, levels, PPE and safety equipment, crane load chart and rigging capacity card.

Task 11 — Performs pre-lift planning.

Context

Pre-lift plans can run from a brief informal plan to a detailed process involving many parties such as companies, engineers, customers and sub-contractors.

Coordinating lift responsibilities with crew members and other tradespeople at pre-lift meetings is a crucial step in planning lifts.

Required Knowledge

K 1	applicable standards and guidelines such as jurisdictional regulations and CSA Z150
K 2	factors affecting the lift such as tail swing, load path and clearances
K 3	roles and responsibilities of all persons involved with the lift
K 4	hazards such as overhead obstructions, powerlines and underground obstacles
K 5	FLRA
K 6	recommended controls to minimize or eliminate risks and hazards
K 7	types of specialty lifts such as engineered, multi-crane lifts and personnel lifts
K 8	jurisdictional and site requirements such as JSA
K 9	engineered drawings
K 10	manufacturers' specifications such as load charts

Sub-task

E-11.01 **Participates in routine, engineered and specialty lift planning.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

E-11.01.01	confirm requirement for engineered drawings according to client/company policies and site specific requirements
E-11.01.02	interpret and verify engineered drawings and site specific requirements to ensure lift proceeds as planned
E-11.01.03	verify lift conditions such as wind, potential hazards, crane configuration and setup, and signalling responsibilities

Sub-task

E-11.02 **Evaluates risks and hazards.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

E-11.02.01	identify hazards such as overhead powerlines, underground infrastructure, underground utilities, obstacles impacting clearances, ground conditions and environmental conditions
E-11.02.02	consult local utilities to verify location and safe limit of approach to utilities
E-11.02.03	recommend controls to eliminate or minimize risks and hazards

Task 12 Sets up crane.

Context Cranes are set up according to pre-lift plans and manufacturers' specifications. Proper setup and positioning of the crane is the basis of all safe lifting operations.

Required Knowledge

K 1	setup procedures according to manufacturers' specifications
K 2	applicable standards and guidelines such as jurisdictional regulations and CSA Z150
K 3	hazards such as overhead obstructions, powerlines and underground obstacles
K 4	recommended controls to minimize or eliminate risks and hazards
K 5	requirements of the job such as radius, crane dimensions, and load weight and dimensions
K 6	engineered drawings
K 7	types of specialty lifts such as engineered, multi-crane lifts and personnel lifts
K 8	jurisdictional and site requirements for issues such as soft and unstable ground conditions
K 9	factors affecting the lift such as tail swing, load path and clearances

Sub-task

E-12.01 Performs final site inspection.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

E-12.01.01	ensure site hazards have been minimized or eliminated and no new hazards have been introduced since completing pre-lift planning
E-12.01.02	identify and report any variations in the engineered drawings such as an obstacle introduced into the lift path, or a change in the size or weight of the lift

Sub-task

E-12.02 Positions crane.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

E-12.02.01	measure radius and refer to manufacturers' load chart specifications
E-12.02.02	follow engineered drawing and establish points of reference
E-12.02.03	determine crane location according to factors such as load size, load weight, obstacles, clearance dimensions and type of operation
E-12.02.04	orientate crane for placement of outriggers and crawlers

Sub-task

E-12.03 Completes setup.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

E-12.03.01	determine setup such as outrigger position, crawlers extended or retracted, and boom length, according to manufacturers' specifications and lift plan
E-12.03.02	determine blocking and crane matting requirements based on ground conditions
E-12.03.03	level crane using outriggers or shimming/blocking tracks
E-12.03.04	confirm crane is level using tools and equipment such as level or crane's computerized display

BLOCK F — CRANE ASSEMBLY, DISASSEMBLY AND TRANSPORT

Trends — Larger cranes are becoming more mobile because of design improvements. User-friendly features such as reeving assist winches are becoming more common.

Related Components — All components apply.

Tools and Equipment — See Appendix A.

Task 13 — Loads and unloads components for transport.

Context — The proper crane and components need to be selected for the job and then loaded or driven onto trailers for transport to the jobsite to then be unloaded for assembly.

Required Knowledge

K 1	centre of gravity of components
K 2	types of rigging such as synthetic, wire rope slings and chain slings
K 3	manufacturers' specifications such as sling points (hook-up points)
K 4	types of tie downs such as chains, cables, turnbuckles and synthetic belts
K 5	weight and size of components and location on transport
K 6	loading and removal sequence for assembly
K 7	driving cranes such as crawlers and rough-terrain (RT) onto transport equipment
K 8	placement procedures to avoid damage
K 9	crane components such as house, car body, outrigger boxes and crawler tracks
K 10	blocking procedures to prevent injury and equipment damage
K 11	site preparation procedures such as ensuring adequate room, traffic control and permits

Sub-task

F-13.01 **Loads crane and components.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-13.01.01	identify and select trailers to be loaded
F-13.01.02	identify and select crane components to be loaded
F-13.01.03	select assist crane according to weights and radius of load
F-13.01.04	determine lifting points according to manufacturers' specifications
F-13.01.05	determine sequence of loading crane components
F-13.01.06	direct assist crane operator and crew for crane component placement
F-13.01.07	distribute crane and component weight on transport equipment according to jurisdictional regulations
F-13.01.08	secure crane and components on transport equipment such as flatbeds, lo-boys, barges and rail cars to satisfy jurisdictional requirements such as a jurisdiction's highway legislation/road regulations
F-13.01.09	remove components from crane to satisfy jurisdictional weight requirements for transport
F-13.01.10	drive crane onto transport equipment considering factors such as type of crane and type of transport equipment
F-13.01.11	confirm all crane components have been loaded

Sub-task

F-13.02 **Unloads crane and components.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-13.02.01	identify and select sequence of trailers to be unloaded
F-13.02.02	select assist crane according to weights and radius of load
F-13.02.03	determine lifting points according to manufacturers' specifications
F-13.02.04	determine sequence of crane components to be unloaded
F-13.02.05	identify a location to assemble the crane

F-13.02.06	unlash/untie crane and components on carriers such as flatbeds, lo-boys, barges and rail cars
F-13.02.07	direct assist crane operator and crew for crane component unloading
F-13.02.08	drive crane off transport equipment considering factors such as type of crane and type of transport equipment
F-13.02.09	confirm all components have been delivered and have not been damaged in transport

Task 14 — Drives cranes on public roadways.

Context

Cranes are self-propelled for driving on public roadways. Disassembly of some cranes may be necessary to comply with road regulations.

Pre-trip planning is necessary and it includes confirming roles and responsibilities of crew members that will be participating in the transport and organizing escort vehicles.

Required Knowledge

K 1	jurisdictional restrictions and regulations for transport such as weight, height, width and requirement for escort vehicles
K 2	components to remove and removal procedures
K 3	manufacturers' specifications such as travel mode
K 4	motor vehicle inspection requirements
K 5	licensing requirements
K 6	stopping distances
K 7	turning radius for boom dollies, boom tip and superstructures
K 8	road conditions such as grades, terrain, ice and mud
K 9	travel route and speed limits

Sub-task

F-14.01 Performs pre-trip planning.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-14.01.01	confirm application for permit has been made
F-14.01.02	interpret permits and confirm route considering factors such as jurisdictional regulations, travel times, lanes of traffic and rush hours
F-14.01.03	verify route using map tools such as the internet and global positioning system (GPS)
F-14.01.04	confirm crane is ready for transport considering factors such as licensing, registration and insurance
F-14.01.05	schedule and confirm time of transport

Sub-task

F-14.02 Prepares crane for transport.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-14.02.01	remove components according to jurisdictional restrictions such as weight, width and height
F-14.02.02	install boom in boom dolly or remove boom from crane
F-14.02.03	perform procedures to set crane to travel mode such as steering, boom float and suspension adjustments
F-14.02.04	check for safety equipment such as road flares, fire extinguishers and reflectors
F-14.02.05	perform pre-trip inspection and complete all required documentation according to employer and jurisdictional requirements

Sub-task

F-14.03 **Drives cranes.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-14.03.01 navigate roads being conscious of factors such as crane size, road width, bridge weight and overpass height restrictions

F-14.03.02 navigate roads being conscious of jurisdictional driving regulations and manufacturers' specifications

Task 15 Assembles and disassembles lattice boom cranes.

Context Mobile crane operators need to disassemble cranes in order to transport them to and from jobsites. Disassembly of the crane may be necessary to comply with road regulations. Mobile crane operators assemble the cranes once on site.

Required Knowledge

K 1 lifting points

K 2 component weight

K 3 pinch points

K 4 blocking procedures

K 5 rigging and hardware

K 6 component preparation (cleaning debris and contaminants from surfaces)

K 7 installation and removal of bridle and boom stops

K 8 boom composition chart and blueprints

K 9 space requirements for assembling

K 10 capabilities and limitations of auxiliary lift equipment

K 11 reeving and lacing (including self-reeving)

K 12 hook block and overhaul ball capacity

K 13 result of using defective hardware

K 14	remote control procedures
K 15	ground conditions
K 16	assembly and disassembly procedures according to manufacturers' specifications

---

Sub-task

F-15.01 **Installs tracks on car body (lattice boom).**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-15.01.01	ensure car body is level
F-15.01.02	remove any blocking between drive sprockets and pads
F-15.01.03	extend/retract tracks
F-15.01.04	position track onto the car body using auxiliary lift equipment or manufacturers' procedures for self-erecting
F-15.01.05	install fasteners according to manufacturers' specifications to secure track on car body
F-15.01.06	join hydraulic/mechanical connections to complete drive/outrigger circuits
F-15.01.07	adjust track and chain tension according to manufacturers' specifications

---

Sub-task

F-15.02 **Installs house (lattice boom).**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-15.02.01	check for defects such as worn bolts, pins and bushings
F-15.02.02	clean all surfaces and apply lubricant to pins and connection points to allow assembly
F-15.02.03	position house onto the car body/carrier using assist crane or manufacturers' recommended procedure for self-erecting cranes
F-15.02.04	install fasteners according to manufacturers' specifications to secure house on car body/carrier
F-15.02.05	connect hydraulic lines and electrical connections to complete circuits

Sub-task

F-15.03 **Installs outrigger boxes (lattice boom).**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-15.03.01	position outrigger box using auxiliary lift equipment such as forklifts, boom trucks or assist cranes depending on type of crane or manufacturers' procedure for self-erecting
F-15.03.02	check for defects such as damaged hoses, fittings and cylinders
F-15.03.03	clean fittings to avoid oil contamination and ensure ease of installation
F-15.03.04	connect hoses and wiring according to manufacturers' specifications to complete hydraulic and electrical circuits
F-15.03.05	install fasteners such as bolts and pins according to manufacturers' specifications to secure the outrigger box to the car body/carrier

Sub-task

F-15.04 **Installs boom base (lattice boom).**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-15.04.01	clean and lubricate pins and bushings to allow assembly
F-15.04.02	raise gantry and/or live mast to working position
F-15.04.03	position boom base onto house using assist crane or live mast depending on type of crane or manufacturers' procedure for self-erecting
F-15.04.04	install fasteners such as heel pins, keeper pins and bridle connections to secure boom base onto house
F-15.04.05	connect hoses and electrical wiring according to manufacturers' specifications to complete circuits

Sub-task

F-15.05 **Assembles boom and jib (lattice boom).**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-15.05.01	check for defects such as damaged chords, lacings and pendants
F-15.05.02	determine installation sequence of boom/jib sections according to manufacturers' specifications
F-15.05.03	use blocking to suit ground conditions
F-15.05.04	lay out and connect boom/jib sections (including pendants and wiring) according to manufacturers' instructions

Sub-task

F-15.06 **Installs counterweights (lattice boom).**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-15.06.01	check for defects such as broken bolts, and damaged threads and pins
F-15.06.02	determine installation sequence and placement of counterweights according to manufacturers' specifications
F-15.06.03	place counterweights on crane (tray or deck) for final installation of assembly
F-15.06.04	raise and lower assembled counterweights into position according to manufacturers' specifications
F-15.06.05	install fasteners such as pins and bolts to secure assembled counterweights according to manufacturers' specifications

Sub-task

F-15.07 **Installs hoist lines, hook blocks and overhaul ball (lattice boom).**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-15.07.01	spool out stored hoist line off of winch while maintaining adequate tension to avoid damaging hoist line
F-15.07.02	cut and seize wire rope lines using cable cutting equipment according to manufacturers' specifications
F-15.07.03	reeve hook block with required parts of line to lift calculated weight
F-15.07.04	terminate wire rope ends using connections such as wedge sockets
F-15.07.05	install fasteners to secure the hoist line to boom head or block/ball

Sub-task

F-15.08 **Removes hoist lines, hook blocks and overhaul ball (lattice boom).**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-15.08.01	remove and store fasteners
F-15.08.02	dismantle end connections (wedge sockets)
F-15.08.03	remove wire rope from hook block
F-15.08.04	spool in hoist line onto winch while maintaining adequate tension to ensure proper spooling
F-15.08.05	secure line on drum to preserve spooling

Sub-task

F-15.09 **Disassembles boom and jib (lattice boom).**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-15.09.01	lower boom/jib onto blocking that suits ground conditions
F-15.09.02	dismantle boom/jib sections (including pendants and wiring) according to manufacturers' instructions
F-15.09.03	remove and store hardware and accessories

Sub-task

F-15.10 **Removes counterweights (lattice boom).**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-15.10.01	remove and store fasteners such as pins and bolts
F-15.10.02	raise and lower counterweight assembly out of position according to manufacturers' instructions
F-15.10.03	disassemble counterweight assembly

Sub-task

F-15.11 **Removes boom base (lattice boom).**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-15.11.01	disconnect hoses and electrical wiring according to manufacturers' specifications
F-15.11.02	support base using auxiliary lift equipment
F-15.11.03	remove and store fasteners such as heel pins, keeper pins and bridle connections

F-15.11.04	lift boom base off house using assist crane or live mast depending on type of crane
F-15.11.05	lower gantry and/or live mast to stowed position

Sub-task

F-15.12 Removes house (lattice boom).

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-15.12.01	support with blocking suitable for ground conditions and level the crane using equipment such as jacks and assist cranes to facilitate removal of house
F-15.12.02	secure house with auxiliary lift equipment
F-15.12.03	disconnect hydraulic lines and electrical connections
F-15.12.04	remove and store fasteners according to manufacturers' specifications
F-15.12.05	lift house off car body/carrier using assist cranes or manufacturers' recommended procedure for self-erecting cranes

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Sub-task

F-15.13 Removes tracks from car body (lattice boom).

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-15.13.01	disconnect hydraulic/mechanical connections for drive/outrigger systems
F-15.13.02	extend/retract tracks
F-15.13.03	support with blocking and level the crane using equipment such as jacks and auxiliary lift equipment to facilitate removal of track
F-15.13.04	ensure weight of track is supported using auxiliary lift equipment before removing fasteners
F-15.13.05	remove and store fasteners according to manufacturers' specifications
F-15.13.06	lift track off the car body using auxiliary lift equipment

Sub-task

F-15.14 Removes outrigger boxes (lattice boom).

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-15.14.01 ensure weight of outrigger box is supported, using auxiliary lift equipment such as forklifts or assist cranes depending on type of crane, before removing hardware

F-15.14.02 remove fasteners such as bolts and pins according to manufacturers' specifications to release the outrigger box from the car body/carrier

F-15.14.03 disconnect hoses and electrical wiring according to manufacturers' specifications

Task 16 Assembles and disassembles telescopic boom cranes.

Context Mobile crane operators need to disassemble cranes in order to transport them to and from jobsites. Disassembly of the cranes may be necessary to comply with road regulations. Mobile crane operators assemble the cranes once on site. Any configuration changes require inspection. Effective communication skills are essential to ensure safety and efficiency when assembling and disassembling telescopic cranes.

Required Knowledge

K 1 lifting points

K 2 component weight

K 3 hydraulic pressure

K 4 reeving of hook block and attachment of overhaul ball

K 5 result of using defective hardware

K 6 capabilities and limitations of auxiliary lift equipment

K 7 component preparation (cleaning debris and contaminants from surfaces)

K 8 rigging and hardware

K 9 rigging procedures

K 10 assembly and disassembly procedures according to manufacturers' specifications

Sub-task

F-16.01 Installs outrigger boxes (telescopic boom).

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-16.01.01	position outrigger box using auxiliary lift equipment such as forklifts or assist cranes depending on type of crane or manufacturers' procedure for self-erecting
F-16.01.02	check for defects such as damaged hoses, fittings and cylinders
F-16.01.03	clean fittings to avoid oil contamination and ensure ease of installation
F-16.01.04	connect hoses and electrical wiring according to manufacturers' specifications to complete hydraulic and electrical circuits
F-16.01.05	install fasteners such as bolts and pins according to manufacturers' specifications to secure the outrigger box to the car body/carrier

Sub-task

F-16.02 Installs main boom (telescopic boom).

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-16.02.01	operate boom launcher or use assist cranes to position main boom for correct installation
F-16.02.02	install fasteners such as pins, bolts and other hardware to secure boom
F-16.02.03	connect hydraulic lines and electrical connections to complete circuits

Sub-task

F-16.03 **Installs hoist lines, hook blocks and overhaul ball (telescopic boom).**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-16.03.01	spool out stored hoist line off of a winch while maintaining adequate tension to avoid damaging hoist line
F-16.03.02	cut and seize wire rope lines using cable cutting equipment according to manufacturers' specifications
F-16.03.03	reeve/lace hook block with required parts of line to lift calculated weight
F-16.03.04	terminate wire ropes ends using connections such as wedge sockets
F-16.03.05	install fasteners to secure the hoist line to boom head or block/ball

Sub-task

F-16.04 **Installs counterweights (telescopic boom).**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-16.04.01	check for defects such as broken bolts, and damaged threads and pins
F-16.04.02	determine installation sequence and placement of counterweights
F-16.04.03	place counterweights on crane (tray or deck) for final installation of assembly
F-16.04.04	raise and lower assembled counterweights into position according to manufacturers' specifications
F-16.04.05	install fasteners such as pins and bolts to secure assembled counterweights

Sub-task

F-16.05 Installs swing-away jibs and inserts (telescopic boom).

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-16.05.01	check for defects such as bent lacings, damaged chords and broken electrical wires
F-16.05.02	swing and pin jib into working position according to manufacturers' specifications
F-16.05.03	install inserts using assist cranes
F-16.05.04	adjust offset to meet lift requirements
F-16.05.05	connect hydraulic components such as luffing cylinders
F-16.05.06	connect electrical components such as anemometer, anti-two block and lights
F-16.05.07	install fasteners according to manufacturers' specifications to ensure structural integrity of boom and jib assembly
F-16.05.08	manually extend telescopic jib extensions

Sub-task

F-16.06 Removes swing-away jibs and inserts (telescopic boom).

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-16.06.01	manually retract telescopic jib extensions
F-16.06.02	remove and store fasteners according to manufacturers' specifications
F-16.06.03	disconnect electrical components such as anemometer, anti-two block and lights
F-16.06.04	disconnect hydraulic components such as luffing cylinders
F-16.06.05	remove inserts using an assist crane
F-16.06.06	return offset to stowed position
F-16.06.07	stow and secure jib for travel according to manufacturers' specifications
F-16.06.08	ensure weight of swing-away jib and inserts are supported by auxiliary equipment before removing any hardware

Sub-task

F-16.07 **Removes counterweights (telescopic boom).**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-16.07.01	remove fasteners such as pins and bolts according to manufacturers' specifications
F-16.07.02	raise and lower counterweight assembly out of position
F-16.07.03	disassemble counterweight assembly

Sub-task

F-16.08 **Removes hoist lines, hook blocks and overhaul ball (telescopic boom).**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-16.08.01	remove and store fasteners
F-16.08.02	dismantle end connections such as wedge sockets
F-16.08.03	remove wire rope from hook block
F-16.08.04	spool hoist line onto winch while maintaining adequate tension to ensure proper spooling
F-16.08.05	secure line on drum to preserve spooling

Sub-task

F-16.09 Removes main boom (telescopic boom).

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-16.09.01	ensure weight of main boom is supported by auxiliary equipment or boom launcher before removing any hardware
F-16.09.02	remove fasteners such as pins, bolts and other hardware
F-16.09.03	disconnect hydraulic lines and electrical connections

Sub-task

F-16.10 Removes outrigger boxes (telescopic boom).

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-16.10.01	ensure weight of outrigger box is supported, using auxiliary lift equipment such as forklifts or assist cranes depending on type of crane, before removing hardware
F-16.10.02	remove fasteners such as bolts and pins to release the outrigger box from the car body/carrier
F-16.10.03	disconnect hoses and electrical wiring

Task 17 — Assembles and disassembles specialty equipment and attachments.

Context Mobile crane operators need to assemble and disassemble specialty equipment according to manufacturers' specifications.

Required Knowledge

K 1	crane and attachments
K 2	types of specialty equipment such as piledriver, clamshell bucket, dragline bucket, concrete bucket, drill, wrecking ball and magnet
K 3	types of specialty attachments such as safety line in hoisting personnel applications
K 4	specialty equipment applications
K 5	assembly and disassembly procedures according to manufacturers' specifications

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Sub-task

F-17.01 Assembles specialty equipment and attachments.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-17.01.01	select crane and attachments for speciality craning operations such as pile driving, clamshell bucket and personnel hoisting
F-17.01.02	select assembly area according to space required and site conditions
F-17.01.03	check for defects such as damaged chords, lacing and wire rope
F-17.01.04	apply lubricant to pins and connection points to allow assembly
F-17.01.05	connect attachments such as leads, hammers, drills and safety devices in sequence according to manufacturers' specifications

Sub-task

F-17.02 Disassembles specialty equipment and attachments.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

F-17.02.01	select disassembly area according to space required and site conditions
F-17.02.02	demobilize crane and remove attachments according to manufacturers' specifications
F-17.02.03	perform post-operational checks to ensure equipment and accessories have not been damaged

Trends

LMI systems now provide slewing angle information which gives the operator constant reference points.

Improved crane design is allowing for simplified clamming operations by having one function perform multiple tasks.

Some cranes are manufactured with on-rubber capacities.

Related Components

All components apply.

Tools and Equipment

See Appendix A.

Task 18 Performs common craning operations.

Context

Configuring the crane and the LMI, and driving cranes on jobsites are common operations performed by all mobile crane operators.

Required Knowledge

K 1	crane manufacturers' procedures for computer setup
K 2	manufacturers' recommended procedures and working practices as described in the operator's manual such as allowable wind limits, load, travel, on rubber and on rubber pick, and carry charts
K 3	site conditions such as ground condition, location of utilities and limits of approach to powerlines
K 4	speed limits
K 5	site regulations
K 6	use of crane mats and blocking
K 7	signalling requirements
K 8	attachments such as heavy lift, tower and luffing jib

Sub-task

G-18.01 Configures load moment indicator (LMI).

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

G-18.01.01	set computer according to manufacturers' specifications to enable rig-up and rig-down of crane and attachments
G-18.01.02	enter and confirm data such as length of boom, jib, jib offset, parts of line, amount of counterweight and position of outriggers in the computer
G-18.01.03	program range limiting device according to hazards such as powerlines and overhead obstructions
G-18.01.04	program range limiting device according to maximum parameters
G-18.01.05	adjust data according to changes in configuration such as switching between attachments and new obstructions

Sub-task

G-18.02 Mobilizes crane on jobsite.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

G-18.02.01	identify hazards and obstacles such as overhead powerlines, underground utilities and other equipment
G-18.02.02	plan route according to ground conditions
G-18.02.03	configure crane for travel according to manufacturers' specifications
G-18.02.04	request support equipment to prepare ground and route
G-18.02.05	set out crane mats and blocking according to ground conditions
G-18.02.06	determine need for a signal person in front and back of crane according to requirements
G-18.02.07	engage and disengage controls to operate functions such as transmission, steering and brakes to move crane
G-18.02.08	monitor crane to ensure it stays within parameters during travel according to manufacturers' specifications

Task 19 — Operates friction drive lattice boom cranes.

Context Operating friction drive lattice boom cranes encompasses both crawler-mounted and truck-mounted cranes.

Required Knowledge

K 1	manufacturers' recommended procedures and working practices as described in the operator's manual
K 2	flow of power to hoist or travel components
K 3	functions of brakes and clutches
K 4	crane manufacturers' procedures for computer setup
K 5	freefall and how to ensure correct operation
K 6	company policy for training requirements regarding freefall mode
K 7	effect of terrain conditions such as uneven or soft ground on pick and carry operations
K 8	truck and chassis onto which crane is mounted
K 9	car body and tracks onto which crane is mounted
K 10	load charts, travel tables and range diagrams according to manufacturers' specifications
K 11	attachments such as heavy lift, tower and luffing jib
K 12	effect of weather on operations such as wind, rain, snow and lightning
K 13	heavy lift operations and procedures

Sub-task

G-19.01 **Operates friction drive crawler-mounted lattice boom cranes.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

G-19.01.01	perform function test to ensure crane operation
G-19.01.02	engage swing, boom, hoist and travel functions in any given direction taking into consideration changing site conditions
G-19.01.03	centre hook block above centre of gravity of the load

G-19.01.04	maintain control of load during all functions such as changing radius, using the hoist, boom, swing and travel controls in combination while taking into consideration changing site conditions
G-19.01.05	coordinate clutch and brake operation to control the load
G-19.01.06	stop crane while maintaining control of load
G-19.01.07	steer and travel crane in any direction while using travel functions to pick and carry, and travel
G-19.01.08	engage dogs/pawls to avoid further movement of load

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Sub-task

G-19.02 **Operates friction drive truck-mounted lattice boom cranes.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

G-19.02.01	perform function test to ensure crane operation
G-19.02.02	engage swing, boom and hoist functions at various speeds in any given direction simultaneously while taking into consideration changing site conditions
G-19.02.03	centre hook block above centre of gravity of the load
G-19.02.04	maintain control of load during all functions
G-19.02.05	control the load while changing radius using the hoist and boom controls in combination while taking into consideration changing site conditions
G-19.02.06	coordinate clutch and brake operation to control the load
G-19.02.07	stop crane while maintaining control of load
G-19.02.08	steer and travel crane on rubber wh[illegible] it is fully assembled
G-19.02.09	engage dogs/pawls to avoid further movement of load

Task 20 Operates hydraulic drive lattice boom cranes.

Context Operating hydraulic drive lattice boom cranes encompasses both crawler-mounted and truck-mounted cranes.

Required Knowledge

K 1	manufacturers' recommended procedures and working practices as described in the operator's manual
K 2	basic hydraulic systems
K 3	crane manufacturers' procedures for computer setup
K 4	freefall mode and how to operate and disengage freefall mode
K 5	company policy for training requirements regarding freefall mode
K 6	effect of terrain conditions such as uneven or soft ground on pick and carry operations
K 7	truck and chassis onto which crane is mounted
K 8	car body and tracks onto which crane is mounted
K 9	load charts, travel tables and range diagrams according to manufacturers' specifications
K 10	attachments such as heavy lift and luffing jib
K 11	effect of weather on operations such as wind, rain, snow and lightning
K 12	heavy lift operations and procedures

Sub-task

G-20.01 Operates hydraulic drive crawler-mounted lattice boom cranes.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

G-20.01.01	perform function test to ensure crane operation
G-20.01.02	engage swing, boom, hoist and travel functions at various speeds in any given direction simultaneously taking into consideration changing site conditions
G-20.01.03	centre hook block above centre of gravity of the load
G-20.01.04	maintain control of load during all functions such as changing radius, using the hoist, boom, swing and travel controls in combination while taking into consideration changing site conditions

G-20.01.05	stop crane while maintaining control of load
G-20.01.06	steer and travel crane in any direction by locking, slowing or counter rotating tracks for pick and carry, and travel

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Sub-task

G-20.02 **Operates hydraulic drive truck-mounted lattice boom cranes.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

G-20.02.01	perform function test to ensure crane operation
G-20.02.02	engage swing, boom and hoist functions at various speeds in any given direction simultaneously while taking into consideration changing site conditions
G-20.02.03	centre hook block above centre of gravity of the load
G-20.02.04	maintain control of load during all functions
G-20.02.05	control the load while changing radius using the hoist and boom controls in combination while taking into consideration changing site conditions
G-20.02.06	stop crane while maintaining control of load

Task 21 Operates telescopic boom cranes.

Context Operating telescopic boom cranes encompasses both crawler-mounted and truck-mounted cranes such as all-terrain (AT), rough-terrain (RT) and carry decks. Boom trucks are mounted on a commercial truck chassis.

Required Knowledge

K 1	manufacturers' recommended procedures and working practices as described in the operator's manual
K 2	basic hydraulic systems
K 3	characteristics of RT cranes such as manoeuvrability and compact size
K 4	operations and limitations of the suspension system
K 5	characteristics of AT cranes such as manoeuvrability, suspension loading and ease of setup
K 6	truck and chassis onto which crane is mounted

K 7	car body and tracks onto which crane is mounted
K 8	crane manufacturers' procedures for computer setup
K 9	manufacturers' main boom extension pinning sequences
K 10	characteristics of boom trucks such as the ability to land load on deck and transport
K 11	characteristics of articulating boom trucks such as telescoping the boom and the ability to land load on deck and transport
K 12	characteristics of carry decks such as manoeuvrability, and the ability to land load on deck and transport
K 13	load and travel charts, travel tables, and range diagrams for pick and carry operations, according to manufacturers' specifications
K 14	attachments such as heavy lift and luffing jibs
K 15	effect of weather on operations such as wind, rain, snow and lightning
K 16	heavy lift operations and procedures
K 17	company policy, jurisdictional regulations and CSA Z150 regulations regarding multi-crane lifts and personnel hoisting procedures

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Sub-task

G-21.01 Operates crawler-mounted telescopic cranes.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

G-21.01.01	perform function test to ensure crane operation
G-21.01.02	extend and retract boom according to manufacturers' specifications
G-21.01.03	centre hook block above centre of gravity of the load
G-21.01.04	engage swing, boom and hoist functions at various speeds in any given direction simultaneously while taking into consideration changing site conditions
G-21.01.05	maintain control of load during all functions
G-21.01.06	control the load while changing radius using the hoist and boom controls in combination while taking into consideration changing site conditions
G-21.01.07	stop crane while maintaining control of load
G-21.01.08	steer and travel crane in any direction by locking, slowing and counter rotating tracks for pick and carry, and travel

Sub-task

G-21.02 Operates rubber-mounted telescopic cranes.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

G-21.02.01	perform function test to ensure crane operation
G-21.02.02	extend and retract boom according to manufacturers' specifications
G-21.02.03	engage swing, boom, hoist and travel functions at various speeds in any given direction simultaneously while taking into consideration changing site conditions
G-21.02.04	centre hook block above centre of gravity of the load
G-21.02.05	maintain control of load during all functions such as changing radius, using the hoist, boom, swing and travel controls in combination while taking into consideration changing site conditions
G-21.02.06	stop crane while maintaining control of load
G-21.02.07	place and secure load on deck of boom truck and carry deck
G-21.02.08	raise and lower suspension system to insert pads under outriggers on AT and truck-mounted cranes
G-21.02.09	perform pick and carry operations on AT, RT, carry deck and truck-mounted cranes according to manufacturers' specifications

Task 22 Performs specialty craning operations.

Context Mobile crane operators are sometimes required to perform specialty operations such as pile driving, multi-crane lifts and duty cycle operations. Some may specialize in one type of specialty crane operation while others diversify their activities.

Required Knowledge

K 1	types of hammers such as drop, diesel, vibratory and air hammers
K 2	hammer and drilling procedures
K 3	types of leads
K 4	types of drills and drilling attachments
K 5	types of pile such as h-beam, pipe, wood and sheet

K 6	drum synchronization
K 7	weight of materials
K 8	types of duty cycle operations such as concrete bucket, clamshell bucket, wrecking ball, dragline and magnet
K 9	duty cycle considerations such as manufacturers' recommendations
K 10	crane setup and configuration requirements for duty cycle operations
K 11	factors affecting crane operation such as tides, current, ballast conditions and spud operation
K 12	manufacturers' barge chart and specifications
K 13	mat placement for travelling the crane
K 14	sizes of wrecking balls
K 15	procedures and sequence of demolition
K 16	capacities of cranes involved in lift
K 17	company policy and CSA Z150 regulations regarding multi-crane lifts and personnel hoisting procedures
K 18	engineered drawings
K 19	hazards specific to multi-crane lifts
K 20	types of personnel hoisting equipment such as fixed basket and suspended basket
K 21	rigging of personnel hoisting equipment
K 22	communication involved in multi-crane and hoisting personnel such as radio and hand signals
K 23	change in weight when lifting in and out of water
K 24	how a crane's actions will affect another during a multi-crane lift

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Sub-task

G-22.01 Operates piledriver.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

G-22.01.01	perform hammer and drill operation with hand-foot-eye coordination according to type of hammer and drill such as hydraulic hammer, vibratory hammer, churn drill, air hammer and diesel hammer
G-22.01.02	drive and extract pile such as steel, concrete and wood

Sub-task

G-22.02 Performs duty cycle operations.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

G-22.02.01	manipulate functions (using hand-foot-eye coordination) such as synchronizing drums to wind cable simultaneously and according to type of duty cycle operation such as clamshell bucket, dragline bucket, magnet, concrete bucket and wrecking ball
G-22.02.02	control load swing out to minimize side loading
G-22.02.03	de-rate crane according to manufacturers' specifications

Sub-task

G-22.03 Operates cranes on barges.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	no	no	yes	NV	ND	ND

Key Competencies

G-22.03.01	verify barge selected is suitable for crane
G-22.03.02	consult crane manufacturers' specifications for barge charts
G-22.03.03	load crane on barge
G-22.03.04	secure crane and boom to barge
G-22.03.05	adapt to variable conditions that affect operations such as weather and tides
G-22.03.06	monitor level and implement measures such as ballast to compensate for trim and list
G-22.03.07	secure crane for transport on a barge taking into consideration overhead obstructions

Sub-task

G-22.04 Performs multi-crane lifts.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

G-22.04.01	maintain constant communication with other crane operator(s) and lift supervisor
G-22.04.02	monitor lift conditions during multi-crane lift for changes in weather and lighting
G-22.04.03	stop lift during unsafe conditions such as lightning and high winds
G-22.04.04	maintain planned load distribution between cranes
G-22.04.05	follow pre-determined lift sequence

Sub-task

G-22.05 Uses personnel hoisting equipment.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

G-22.05.01	attach personnel hoisting equipment according to jurisdictional, site, company and manufacturers' requirements, and CSA Z150 standard
G-22.05.02	verify engineer's requirements for capacity and certification of suspended work platform
G-22.05.03	perform test according to regulations
G-22.05.04	verify crew involved wear fall arrest equipment and tie off according to jurisdictional and manufacturers' specifications
G-22.05.05	monitor lift conditions during personnel lift for changes in weather and lighting
G-22.05.06	stop lift during unsafe conditions

Task 23 Secures crane.

Context Short term shut downs are those when the crane is unattended during normal operations through the day. Long term shut downs are overnight or longer.

Required Knowledge

K 1	procedures for securing crane
K 2	manufacturers' recommendations for securing crane
K 3	company policies for securing crane
K 4	surrounding area
K 5	length of time crane will be non-operational
K 6	CSA Z150 standard and jurisdictional regulations for securing crane

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Sub-task

G-23.01 Secures crane for short-term.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

G-23.01.01	lower load to the ground
G-23.01.02	engage swing brakes, and hoist brakes and dogs/pawls
G-23.01.03	shut off engine and master switches

Sub-task

G-23.02 Secures crane for long-term.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	ND	ND

Key Competencies

G-23.02.01	lower load to the ground and disconnect from hook
G-23.02.02	swing boom away from structures
G-23.02.03	engage swing brakes, and hoist brakes and dogs/pawls
G-23.02.04	lower boom and attachments according to manufacturers' specifications

G-23.02.05	block boom according to ground conditions
G-23.02.06	shut off engine and master switches
G-23.02.07	remove key and lock doors
G-23.02.08	remove any ladders or steps that restrict access
G-23.02.09	erect barriers around crane according to site and company policy
G-23.02.10	put up warning flags, tape and signs around crane according to site and company policy
G-23.02.11	block equipment to prevent freezing to the ground as per weather conditions

APPENDICES

APPENDIX A — TOOLS AND EQUIPMENT

Hand Tools

adjustable wrenches (various sizes)
cable cutter
cable winder
calculator
flashlight
grease gun
hammers (ball peen, claw, sledge, various sizes)
level
line-up bar, drift pin, T-bar
measuring tape
oilcan
pliers (needle nose, slip joint)
pry bars
punches (knock-out type, various sizes)
ratchet set
scrapers (various sizes)
screwdrivers (flat, Phillips, Robertson, various sizes)
shovel
snips (heavy duty wire cutting)
sprayer
spud wrenches
tire pressure gauge
tool box
vernier caliper
vice grips
wear gauge (cable and sheave)
wire brush
wrench sets (open and closed ends, both metric and imperial)

Power Tools and Equipment

angle grinder with wire brush
chain saws
electric drills
forklift/zoom boom
hand-held and stationary radios
headphones/radio
hydraulic jacks
impact wrenches (electric and pneumatic)
steam cleaner or power wash

Personal Protective Equipment (PPE) and Safety Equipment

coveralls
ear-plugs and muffs
eye wash station
face shields
fall arrest harness
fire blankets
fire extinguishers
fire-retardant coverall
first aid kit
gloves
hard hat
masks (particles, vapour)
reflectors
respirators
road flares
safety boots
safety glasses and goggles
spill kit

Hoisting and Rigging Equipment

aerial platforms (boom and scissor lifts)
blocks
bridles
cable clips
chains
come-alongs (wire rope or chain) and chain falls (manual or electric)
equalizer beams
eye bolts
hook latch
hooks
ladders
lines
pulleys, sheaves and snatch blocks
rope guides
shackles
slings
softeners
spreader bars
swivels
tag lines
turnbuckles
wedge socket

APPENDIX B GLOSSARY

air system	any machine system that is dependent on compressed air; the brakes on certain carriers would be an example of this type of system
all-terrain (AT) crane	all-terrain cranes can be configured to be driven from both the carrier and the upper; they usually have a "pick and carry" chart, and can be driven on public roads; they are rubber mounted (on tires); they have hydraulic suspension, which can be adjusted by the operator into "road" or "jobsite"; they may have hydraulic or lattice booms; these cranes usually have multiple axles, some of which may be "dead" and are for weight distribution only; they have various steering modes
angle indicator	device on the crane used to determine the angle at which the boom is situated relative to the horizontal plane
attachments	accessories supplied by manufacturers used to increase crane capacity
blocking pads	wood, metal, or synthetic assemblies that are placed under the adjustable ends of the outriggers or tracks; these items increase the amount of bearing and support given by the outriggers or the tracks to the crane
boom	part of the crane that extends above the upper works or superstructure and supports the line or lines to which the load is attached
boom configuration	how the boom is utilized; the configuration, for example, may include the addition of extensions, jibs, etc.
cable cutter	mechanical device especially designed to cut wire rope
car body	frame of a chassis for a crawler crane to which the tracks and upper works attach
chassis	part of the carrier that includes the steering and braking mechanisms, suspension, drive train and tracks or wheels
clamshell	special assembly installed at the lifting end of the hoist line that is designed to open and close in order to move mud, sand or other loose materials
controls	mechanisms that include all levers, brakes, dogs, switches, buttons and other devices that the crane operator physically manipulates

counterweight	heavy metal or concrete attachments secured to the back of the upper works to offset the weight of the extended boom and load and increase lift capacity
crawler crane	mobile crane that uses a track-driven carrier
demolition work	mobile cranes may be used to swing or drop a heavy metal wrecking ball against or onto structures that are to be demolished
dog	device or control that locks or stops machinery or components (usually winches) from rotating
dragline	accessory installed at, and suspended by, the lifting end of the hoist line that is designed to scrape earth or other material into it as it is dragged toward the crane by a second drum
drum	cylindrical component on the mobile crane that is used to store and dispense line; the line is wound or spooled onto the drum when the operator causes the drum to rotate
extend the boom	hydraulic cranes, in most cases, have one or more telescoping sections to the main boom; this is one feature that allows the operator to control the length of the boom
freefall	capability of a hoist line on a drum to unwind using only the weight of the load or lifting device attached to the hoist line
gross load	weight of the load plus other items, such as the hook block, hoist lines, rigging, etc.
hardware	usually refers to rigging hardware, which can be any of a wide range of bolts, hooks, chains, shackles, clamps, and other mechanical devices used to secure or attach to loads in preparation for hoisting
hoist line	single line attached to a ball, lift hook or other assembly; the term hoist line may also be used to describe the compound assembly of lines running through the hook block
hoisting	act of manipulating the crane controls in order to move a load
hook block	heavy metal block containing sheaves or pulleys, located at the end of the hoist line on some cranes; the hook block is equipped with a hook for attachment of loads
hydraulic system	system that relies on pressurized oil to make it function; the boom on hydraulic cranes is manipulated through the use of oil under pressure

lashing	chain, steel cable or synthetic materials used to secure crane components or other equipment in preparation for transportation
levelling	process of positioning the crane so that it is level prior to lifting a load
log book	book in which the operator is required to record information, such as inspection, maintenance, locations, hours worked as well as damage and repair details
magnet work	attachment installed at the lifting end of the hoist line in order to lift and move metal
multi-crane lifts	lifts which are performed simultaneously by two or more cranes attached to the same load; in some instances, it is impossible to accomplish certain lifts using only one crane
net capacity	lift that can be made that is, gross capacity minus attachments, lifting devices, hooks and rigging
outriggers	supports that extend from the carrier vehicle to the ground to provide stability; outriggers are composed of beams and jacks
pile-driving	use of the mobile crane to force metal, concrete or wooden pilings into the ground
radius	horizontal distance from the centre of rotation of a crane to the centre of gravity of load with the load suspended
reeving	method of installing parts of line, in a multiple part line system; each sheave turns at a different speed; helps balance the sheave speed across the block; therefore the block travels level as it is hoisted up and down
rig	act of attaching loads to the hoist line
rig-up/rig-down	assembly and disassembly of crane and components
rigger	designated individual whose duty it is to ensure that loads are appropriately attached or rigged to the hoist line of the crane
rough-terrain (RT) crane	rough terrain cranes are rubber mounted (on tires) and may be two or all-wheel drive and various steering modes; they have solid suspension and axle lockouts; RT cranes have off road capability; they have "on-rubber" charts
sheaves	wheels or pulleys located in a hook block, boom heads, or other parts of the crane boom on which the line runs

signal	approved signs given to the operator by the signaller; the signaller may use hands and arms to relay the information, or may rely on a radio to give verbal cues to the operator
signaller	designated individual who relays information to the crane operator
sling	any metal or synthetic flexible device used to cradle or support a load
specialty equipment	equipment used for a specific operation
spooling	process of winding line either onto or off of a drum on which it is stored
swing (slewing)	rotating the upper works horizontally through part or all of the radius or circle
tracks	carrier system used to move certain cranes that require the use of tracks rather than wheels
truck-mounted crane	truck-mounted cranes steer from the front axles only; and a lower deck and smaller tires than AT cranes; they may have either lattice or hydraulic booms; the cranes are rubber mounted (on tires); these cranes must be driven from the carrier; they can be configured to be driven on public roads
upper works (house)	part of the mobile crane above the carrier which rotates and supports the boom, winches, cylinders and other components
wire rope	material made of many extremely strong and flexible metal alloy wires wound in various configurations to suit a range of conditions; often referred to as cable

APPENDIX C ACRONYMS

AT	all-terrain
CSA	Canadian Standards Association
FLRA	field level risk assessment
GPS	global positioning system
JSA	job scope analysis
LMI	load moment indicator
OH&S	Occupational Health and Safety
PLH	powerline hazards
PPE	personal protective equipment
RT	rough-terrain
WHMIS	Workplace Hazardous Materials Information System
WLL (SWL)	working load limit (safe working load)

APPENDIX D — BLOCK AND TASK WEIGHTING

BLOCK A COMMON OCCUPATIONAL SKILLS

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	5	6	NV	5	NV	3	6	5	10	5	NV	ND	ND	6%

Task 1 Performs safety-related functions.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	70	50	NV	42	NV	35	75	60	50	50	NV	ND	ND	54%

Task 2 Organizes work.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	30	50	NV	58	NV	65	25	40	50	50	NV	ND	ND	46%

BLOCK B HOISTING CALCULATIONS

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	18	21	NV	18	NV	25	17	35	20	25	NV	ND	ND	22%

Task 3 Determines load weights.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	20	25	NV	25	NV	20	25	36	20	25	NV	ND	ND	25%

Task 4 Calculates crane capacity.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	40	40	NV	50	NV	40	50	37	40	50	NV	ND	ND	43%

Task 5 Performs rigging calculations.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	40	35	NV	25	NV	40	25	27	40	25	NV	ND	ND	32%

BLOCK C CRANE INSPECTION AND MAINTENANCE

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	15	10	NV	10	NV	12	10	6	10	5	NV	ND	ND	10%

Task 6 Performs pre-operational checks and regular inspections.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	40	40	NV	48	NV	65	50	43	60	50	NV	ND	ND	49%

Task 7 Performs operational and continual checks.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	30	50	NV	26	NV	25	30	36	20	30	NV	ND	ND	31%

Task 8 Performs minor crane maintenance.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	30	10	NV	26	NV	10	20	21	20	20	NV	ND	ND	20%

BLOCK D RIGGING

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	20	14	NV	14	NV	13	14	10	10	15	NV	ND	ND	14%

Task 9 Inspects, maintains and stores slings and hardware.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	50	60	NV	29	NV	30	40	48	50	40	NV	ND	ND	43%

Task 10 Follows rigging procedures.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	50	40	NV	71	NV	70	60	52	50	60	NV	ND	ND	57%

BLOCK E LIFT PLANNING, SITE PREPARATION AND CRANE SETUP

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	18	17	NV	16	NV	22	23	12	10	10	NV	ND	ND	16%

Task 11 Performs pre-lift planning.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	50	40	NV	32	NV	35	60	48	50	50	NV	ND	ND	46%

Task 12 Sets up crane.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	50	60	NV	68	NV	65	40	52	50	50	NV	ND	ND	54%

BLOCK F CRANE ASSEMBLY, DISASSEMBLY AND TRANSPORT

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	10	11	NV	14	NV	20	9	12	10	20	NV	ND	ND	13%

Task 13 Loads and unloads components for transport.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	22	20	NV	24	NV	20	20	18	10	10	NV	ND	ND	18%

Task 14 Drives cranes on public roadways.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	12	10	NV	12	NV	10	20	18	20	10	NV	ND	ND	14%

Task 15 Assembles and disassembles lattice boom cranes.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	22	30	NV	19	NV	30	20	25	30	40	NV	ND	ND	27%

Task 16 Assembles and disassembles telescopic boom cranes.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	22	30	NV	27	NV	25	20	21	30	30	NV	ND	ND	26%

Task 17 Assembles and disassembles specialty equipment and attachments.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	22	10	NV	18	NV	15	20	18	10	10	NV	ND	ND	15%

BLOCK G CRANE OPERATIONS

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	14	21	NV	23	NV	5	21	20	30	20	NV	ND	ND	19%

Task 18 Performs common craning operations.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	18	30	NV	25	NV	15	25	25	20	11	NV	ND	ND	21%

Task 19 Operates friction drive lattice boom cranes.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	18	14	NV	12	NV	15	10	17	20	18	NV	ND	ND	16%

Task 20 Operates hydraulic drive lattice boom cranes.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	18	14	NV	20	NV	20	15	17	20	18	NV	ND	ND	18%

Task 21 Operates telescopic boom cranes.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	18	14	NV	25	NV	20	15	18	20	18	NV	ND	ND	18%

Task 22 Performs specialty craning operations.

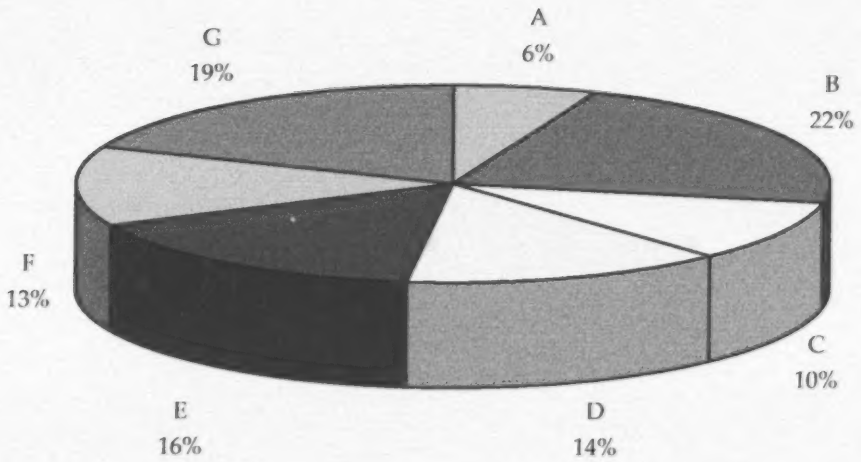
	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	18	14	NV	10	NV	20	20	13	10	30	NV	ND	ND	17%

Task 23 Secures crane.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	10	14	NV	8	NV	10	15	10	10	5	NV	ND	ND	10%

APPENDIX E

PIE CHART*



TITLES OF BLOCKS

BLOCK A	Common Occupational Skills	BLOCK E	Lift Planning, Site Preparation and Crane Setup
BLOCK B	Hoisting Calculations	BLOCK F	Crane Assembly, Disassembly and Transport
BLOCK C	Crane Inspection and Maintenance	BLOCK G	Crane Operations
BLOCK D	Rigging		

*Average percentage of the total number of questions on an interprovincial examination, assigned to assess each block of the analysis, as derived from the collective input from workers within the occupation from all areas of Canada. Interprovincial examinations typically have from 100 to 150 multiple-choice questions.

APPENDIX F

TASK PROFILE CHART – Mobile Crane Operator

BLOCKS	TASKS	SUB-TASKS				
A - COMMON OCCUPATIONAL SKILLS	1. Performs safety-related functions.	1.01 Maintains a safe work environment.	1.02 Uses personal protective equipment (PPE) and safety equipment.			
	2. Organizes work.	2.01 Communicates with others.	2.02 Uses documentation.			
B - HOISTING CALCULATIONS	3. Determines load weights.	3.01 Identifies the weight.	3.02 Calculates weight.			
	4. Calculates crane capacity.	4.01 Determines radius and crane configuration.	4.02 Interprets load charts.			
	5. Performs rigging calculations.	5.01 Performs sling angle calculations.	5.02 Performs working load limit (WLL) calculations.			
C - CRANE INSPECTION AND MAINTENANCE	6. Performs pre-operational checks and regular inspections.	6.01 Inspects engine systems.	6.02 Inspects air systems.	6.03 Inspects electrical systems.	6.04 Inspects hydraulic systems.	6.05 Inspects chassis/car body and running gear components.
		6.06 Inspects outriggers and counterweights.	6.07 Inspects boom components and attachments.	6.08 Inspects hoisting systems.		

BLOCKS	TASKS	SUB-TASKS			
	7. Performs operational and continual checks.	7.01 Checks operating controls.	7.02 Inspects monitoring and warning systems.	7.03 Monitors running lines, hoist lines and standing ropes.	7.04 Monitors gauges and warning systems.
	8. Performs minor crane maintenance.	8.01 Changes oil and filters.	8.02 Greases crane.	8.03 Lubricates wire ropes.	8.04 Makes minor adjustments and replacements.
D - RIGGING	9. Inspects, maintains and stores slings and hardware.	9.01 Lubricates slings and hardware.	9.02 Identifies deficiencies in slings and hardware.	9.03 Disposes of damaged slings and hardware.	9.04 Stores slings and hardware.
	10. Follows rigging procedures.	10.01 Selects required rigging.	10.02 Rigs load.	10.03 Monitors rigging.	
E - LIFT PLANNING, SITE PREPARATION AND CRANE SETUP	11. Performs pre-lift planning.	11.01 Participates in routine, engineered and specialty lift planning.	11.02 Evaluates risks and hazards.		
	12. Sets up crane.	12.01 Performs final site inspection.	12.02 Positions crane.	12.03 Completes setup.	
F - CRANE ASSEMBLY, DISASSEMBLY AND TRANSPORT	13. Loads and unloads components for transport.	13.01 Loads crane and components.	13.02 Unloads crane and components.		
	14. Drives cranes on public roadways.	14.01 Performs pre-trip planning.	14.02 Prepares crane for transport.	14.03 Drives cranes.	

BLOCKS	TASKS	SUB-TASKS				
	15. Assembles and disassembles lattice boom cranes.	15.01 Installs tracks on car body (lattice boom).	15.02 Installs house (lattice boom).	15.03 Installs outrigger boxes (lattice boom).	15.04 Installs boom base (lattice boom).	15.05 Assembles boom and jib (lattice boom).
		15.06 Installs counterweights (lattice boom).	15.07 Installs hoist lines, hook blocks and overhaul ball (lattice boom).	15.08 Removes hoist lines, hook blocks and overhaul ball (lattice boom).	15.09 Disassembles boom and jib (lattice boom).	15.10 Removes counterweights (lattice boom).
		15.11 Removes boom base (lattice boom).	15.12 Removes house (lattice boom).	15.13 Removes tracks from car body (lattice boom).	15.14 Removes outrigger boxes (lattice boom).	
	16. Assembles and disassembles telescopic boom cranes.	16.01 Installs outrigger boxes (telescopic boom).	16.02 Installs main boom (telescopic boom).	16.03 Installs hoist lines, hook blocks and overhaul ball (telescopic boom).	16.04 Installs counterweights (telescopic boom).	16.05 Installs swing-away jibs and inserts (telescopic boom).
		16.06 Removes swing-away jibs and inserts (telescopic boom).	16.07 Removes counterweights (telescopic boom).	16.08 Removes hoist lines, hook blocks and overhaul ball (telescopic boom).	16.09 Removes main boom (telescopic boom).	16.10 Removes outrigger boxes (telescopic boom).
	17. Assembles and disassembles specialty equipment and attachments.	17.01 Assembles specialty equipment and attachments.	17.02 Disassembles specialty equipment and attachments.			
G - CRANE OPERATIONS	18. Performs common craning operations.	18.01 Configures load moment indicator (LMI).	18.02 Mobilizes crane on jobsite.			
	19. Operates friction drive lattice boom cranes.	19.01 Operates friction drive crawler-mounted lattice boom cranes.	19.02 Operates friction drive truck-mounted lattice boom cranes.			

BLOCKS	TASKS	SUB-TASKS				
	20. Operates hydraulic drive lattice boom cranes.	20.01 Operates hydraulic drive crawler-mounted lattice boom cranes.	20.02 Operates hydraulic drive truck-mounted lattice boom cranes.			
	21. Operates telescopic boom cranes.	21.01 Operates crawler-mounted telescopic cranes.	21.02 Operates rubber-mounted telescopic cranes.			
	22. Performs specialty craning operations.	22.01 Operates piledriver.	22.02 Performs duty cycle operations.	22.03 Operates cranes on barges.	22.04 Performs multi-crane lifts.	22.05 Uses personnel hoisting equipment.
	23. Secures crane.	23.01 Secures crane for short term.	23.02 Secures crane for long term.			